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Ureaplasma Urealyticum and Mycoplasma Hominis Isolation from Cervical Secretions of Pregnant Women and Nasopharyngeal Secretions of their Babies at Delivery

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ABSTRACT

Background: **A prospective study was carried out at the University Hospital, Kuala Lumpur to determine the cervical carriage rate of *Ureaplasma urealyticum* and *Mycoplasma hominis* among healthy pregnant women at delivery and the incidence of nasopharyngeal colonisation among their infants.**

Patients: **Sixty mother and baby pairs were examined.**

Results: **Cervical colonisation among the mothers was found to be 56.7% for *U.urealyticum* and 17.7% for *M.hominis*. The transmission rate to their infants was 88.2% and 30% for *U.urealyticum* and *M.hominis* respectively.**

Conclusion: **There was no statistically significant difference in the maternal colonisation rates according to ethnic group, parity and past history of abortion. All *U.urealyticum* isolates in our study were sensitive to erythromycin but about one-third were resistant to tetracycline and ciprofloxacin and 26.5% were resistant to minocycline.**

Keywords: ***Ureaplasma urealyticum, Mycoplasma hominis*, colonisation**

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INTRODUCTION

Ureaplasma urealyticum and *Mycoplasma hominis* are common inhabitants in the urogenital tract of women. Reports from various studies show that colonisation rates range from 40% to 80%[1,2]. These mycoplasmas can be transmitted from colonised pregnant women to their newborn infants mainly during delivery and less commonly transplacentally or via an ascending route[3]. Rates of perinatal transmission of *U.urealyticum* had been reported to range from 18% to 55% among full term infants and 29% to 55% among preterm infants[4-6]. The pathogenic potential of these organisms in colonised infants is difficult to ascertain but there is increasing evidence that *U.urealyticum* can cause septicaemia, respiratory and central nervous system disease in preterm infants[3]. The study of these infections have been impeded by the lack of simple laboratory tests for routine diagnosis. Recently, a commercial kit for the isolation, identification and limited antibiotic susceptibility testing of *U.urealyticum* and *M.hominis*, the Mycofast, "All-in" kit, manufactured by International Mycoplasma, France was available in Malaysia. We used this kit to study the prevalence of maternal colonisation and the incidence of perinatal transmission among pregnant women and their newborns at the University Hospital, Kuala Lumpur.

PATIENTS AND METHOD

This prospective study was carried out at the University Hospital, Kuala Lumpur (UHKL) in January and February 1996. The study population consisted of 60 women with normal term pregnancy admitted to the labour ward for delivery and their newborn babies. All babies were delivered by normal vaginal delivery. A commercially available Mycofast "All-in" kit (manufactured by International Mycoplasma, France) was used for the isolation, identification and antimicrobial susceptibility testing of *U.urealyticum* and *M.hominis*. This kit was found to be as sensitive as the classic method of isolation and enumeration of mycoplasmas on gelose A7 (98.5% correlation)[7].

In the delivery room, cervical secretion was collected from the mother using a plain sterile cotton swab during the first obstetric examination. The specimen collected was immediately discharged into the Mycofast "All-in" transport medium. Within 12 hours, the inoculated transport medium was transferred into the Mycofast "All-in" lyophilisat and the resultant lyophilisat was inoculated into respective wells in the Mycofast tray. Two drops of *M.hominis* supplement were added into the wells for *M.hominis* detection and enumeration. All the wells in the tray were covered with a layer of sterile liquid paraffin for anaerobiosis and subsequently incubated at 37°C.

Nasopharyngeal secretions was collected into a sterile mucous extractor which was connected to a low suction vacuum pump as soon as the baby's head was delivered. Three drops of the secretion were transferred immediately into the Mycofast

"All-in" transport medium using a sterile 2.5 mL syringe (without needle). This was subsequently processed in the same way as the maternal cervical secretion. The inoculated Mycofast "All-in" tray was read by the naked eye twice a day for up to 24 hours for cervical secretions and 72 hours for nasopharyngeal secretions. Positive results were indicated by a colour change in the respective wells for the detection of *U.urealyticum* and *M.hominis* and their susceptibility to tetracycline, minocycline, ciprofloxacin and erythromycin.

The statistical tests applied for this study were Chi square, Fisher exact and McNemar tests. The comparison of results was based on the significance level of $p < 0.05$.

RESULTS

U.urealyticum was isolated from the cervical secretions of 34 (56.7%) mothers and nasopharyngeal secretions of 30 (50%) babies, giving a transmission rate of 88.2% (Table I). The corresponding rates of isolation for *M.hominis* were 17.7% and 5% respectively, giving a transmission rate of 30% (Table II). All the mothers positive for *M.hominis* were also positive for *U.urealyticum* while the reverse did not happen. All babies with mycoplasma isolates were from colonised mothers.

The overall mean (±SD) birthweight of the newborns in this study was 3,179 (±400) grams, with a range of 2,300 to 4,090 grams. The mean birthweight of the neonates born to mothers with *U.urealyticum* isolated was 3,130 (±402) grams (range 2,300 to 3,840 grams), while that of the neonates born to mothers without *U.urealyticum* isolated was 3,243 (±486) grams (range 2,540 to 4,090 grams). The difference in mean birthweight for the two groups was not statistically significant ($p > 0.1$).

The distribution of *U.urealyticum* and *M.hominis* from the cervical secretions of the pregnant women according to ethnic group, parity and past history of abortion is shown in Tables III, IV and V. There was no statistically significant difference in the colonisation rates by any of the parameters examined.

Table I – Isolation rate of *Ureaplasma urealyticum* from mothers and babies

	Mother	Baby	Transmission rate
Positive (%)	34 (56.7)	30 (50)	30/34 (88.2)
Negative	26	30	
Total	60	60	

Table II – Isolation rate of *Mycoplasma hominis* from mothers and babies

	Mother	Baby	Transmission rate
Positive (%)	10 (16.7)	3 (5)	3/10 (30)
Negative	50	57	
Total	60	60	

The antibiotic sensitivity pattern of *U.urealyticum* from the nasopharyngeal secretions of all the babies corresponded to that of the isolates from their respective maternal cervical secretions. More than a third of the isolates were resistant to tetracycline (35.3%) and ciprofloxacin (38.2%) while 26.5% were resistant to minocycline. All isolates were sensitive to erythromycin (Table VI).

DISCUSSION AND CONCLUSION

The urogenital colonisation rates of *U.urealyticum* and *M.hominis* in our study were comparable to those obtained in other studies[1,2]. The maternal colonisation of *U.urealyticum* is significantly higher than that of *M.hominis* (McNemar $\chi^2 = 24$, $p < 0.05$). The transmissibility of *U.urealyticum* from the mothers to their respective babies was also significantly higher compared to that of *M.hominis* (Fisher p=0.0008). This suggests that *U.urealyticum* is potentially a more important pathogen than *M. hominis* in the pathogenesis of adverse outcome of pregnancy and infant disease. However, its frequent presence in the healthy population has obscured its clinical significance. Since *U.urealyticum* is heterogeneous, it is possible that different strains are associated with different pathogenecity. Hence, the clinical management of culture positive infants may require subgrouping to identify pathogenic *U.urealyticum* as well as the identification of other risk factors predictive of invasive disease.

Tetracycline and erythromycin have been the drugs of choice for the treatment of mycoplasma infections. However, *M.hominis* are uniformly resistant to macrolides. We were unable to determine tetracycline and ciprofloxacin resistance among *M.hominis* in this study as the kit we used did not allow for the testing of *M.hominis* susceptibility in the presence of *U.urealyticum*. Among *U.urealyticum*, resistance to erythromycin and tetracycline are increasingly reported worldwide[8] but there is little data from South East Asia. Tan et al[9] found 1% – 11% resistance to various tetracyclines among *U.urealyticum* isolates from men with non-gonococcal urethritis. Our resistance rates were much higher (tetracycline – 35.3%, minocycline – 26.5%). We found no erythromycin resistance among our isolates but other workers have reported up to 18% resistance including strains of high level resistance (minimal inhibitory concentration > 256 mg/L)[10]. The newer macrolides, clarithromycin and azithromycin generally have lower MICs than erythromycin but clinical experience with these drugs is limited. Newer quinolones like ciprofloxacin have also good in-vitro activity against *U.urealyticum* but again resistance has been noted (10% reported by Ridgeway et al[11], 38.2% in this study).

Our results indicate that in our settings, the microlide drug group would be more suitable for the empirical treatment of neonatal infection if aetiology of mycoplasmal origin is suspected since *U.urealyticum* infection is more likely than

Table III – Urogenital colonisation rate of mycoplasmas by ethnic group

		U.urealyticum		*M.hominis*	
	Total	Positive (%)	Negative	Positive (%)	Negative
Malays	37	18 (48.6)	19	8 (20.2)	29
Chinese	10	8 (80.0)	2	1 (10.0)	9
Indians	13	8 (61.5)	5	1 (7.0)	12
		χ^2 = 3.31, p = 0.19		χ^2 = 1.73, p = 0.42	

Table IV – Urogenital colonisation rate of mycoplasmas by parity

		U.urealyticum		*M.hominis*	
	Total	Positive (%)	Negative	Positive (%)	Negative
Primegravida	33	20 (60.6)	13	5 (15.2)	28
Multigravida	27	14 (51.8)	13	5 (18.5)	22
		χ^2 = 0.18, p = 0.68		Fisher, p = 0.69	

Table V – Urogenital colonisation rate of mycoplasmas by past abortion

		U.urealyticum		*M.hominis*	
	Total	Positive (%)	Negative	Positive (%)	Negative
Abortion	7	3 (42.8)	4	0	7
No abortion	53	31 (58.5)	22	10	43
		Fisher, p = 0.45		Fisher, p = 0.59	

Table VI – Antibiotic resistances of *U.urealyticum* isolates from maternal cervical secretion

	No.tested	No. sensitive (%)	No. resistant (%)
Tetracycline	34	22 (64.7)	12 (35.3)
Minocycline	34	25 (73.5)	9 (26.5)
Ciprofloxacin	34	21 (61.8)	13 (38.2)
Erythromycin	34	34 (100)	0 (0)

M.hominis and most *U.urealyticum* strains are susceptible to these antibiotics. The culture positive infants in our study are being followed-up for possible disease development and for their response to antibiotic therapy should treatment be given.

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